Complete Summary

GUIDELINE TITLE

Cardiometabolic risk management in primary care.

BIBLIOGRAPHIC SOURCE(S)

Quality Improvement Team in Chronic Care (CCQI). Cardiometabolic risk management in primary care. Qatif (Saudi Arabia): Qatif Primary Health Care; 2008. Various p.

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

- Type 2 diabetes mellitus (T2DM)
- Cardiovascular disease (CVD)
- Cardiometabolic risk factors associated with T2DM and CVD including:
  - Metabolic syndrome
  - Hyperglycemia
  - Dyslipidemia (hypercholesterolemia)
  - Hypertension
  - Obesity
  - Depression

GUIDELINE CATEGORY

Counseling
Diagnosis
Evaluation
Management
Risk Assessment
Screening
Treatment

CLINICAL SPECIALTY

Cardiology
Endocrinology
Family Practice
Internal Medicine
Preventive Medicine

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Dietitians
Health Care Providers
Nurses
Physician Assistants
Physicians
Psychologists/Non-physician Behavioral Health Clinicians

GUIDELINE OBJECTIVE(S)

- To provide a comprehensive approach to the management of cardiometabolic risk (CMR) factors in non-pregnant adults
- To include nutrition therapy, physical activity recommendations, pharmacologic therapy, self-management, as well as prevention and diagnosis of CMR-associated complications
- To provide suggestions to the management of the delivery system, the clinical information and the quality of care

TARGET POPULATION

- Non-pregnant adult patients in Saudi Arabia
- Individuals at increased risk for cardiovascular disease (CVD) and type 2 diabetes mellitus (T2DM), including:
    - Individuals at age of 45 years and over (preferably, at age of 35 for male)
    - All obese individuals
    - All hypertensive, diabetic and dyslipidemic individuals

INTERVENTIONS AND PRACTICES CONSIDERED

Screening/Diagnosis/Risk Assessment for Cardiometabolic Risk

1. Family and patient medical history
2. Physical examination: body mass index (BMI), waist circumference, blood pressure
3. Laboratory tests: lipid profile, triglycerides, glucose; fasting blood sugar. serum uric acid, serum creatinine and glomerular filtration rate estimation (eGFR), serum potassium and sodium, hemoglobin and hematocrit, urinalysis (including microalbuminuria assessment), C-reactive protein
4. Electrocardiogram
5. Screening for depression
6. Assessment of cardiovascular (CV) risk

Management/Treatment

1. Lifestyle counseling and goal setting, including smoking cessation
2. Annual assessment: targeted history and physical exam, CV and cerebrovascular assessment, renal assessment, foot exam and risk assessment for diabetes patients, dilated eye exam, re-estimation of CV risk, mood assessment
3. Specialist referral
4. Frequency of follow-up for various conditions
5. Drug therapy (anti-hypertensive agents, anti-glycemic agents, dyslipidemic agents [particularly statins]) alone or in combination
6. Aspirin therapy
7. Coordination of care
8. Self-management

MAJOR OUTCOMES CONSIDERED

- Changes in laboratory markers of cardiometabolic risk
- Changes in blood pressure
- Hospitalization or emergency room visit rates
- Morbidity and mortality

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

In general, the evidence analyses used were published evidence-based guidelines, concerned with the screening, management and prevention of hypertension (HTN), diabetes mellitus (DM), dyslipidemia and obesity, from the year 2001 till 2007.

However, members of the group were asked to identify any more recent publications relevant to the section of the guideline allotted to them. Members of the group were encouraged to review details of papers referred to in the published

guidelines. Key evidence-based reviews and meta-analyses are also referenced. National guidelines were reviewed and matched with particular attention to the quality measures and information management.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Review
Review of Published Meta-Analyses

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The guideline development involved a broad group of primary health care professionals, including physicians, nurse practitioners, specimen-collection nurses, screening nurses, pharmacists, educationists and dietitians, as per page 1-4 of the original guideline document.

Within the group, a number of people had considerable experience in guideline development and in health-care administration, as well as in primary health care development and delivery of service.

The steps to formulate the recommendations are provided in the original guideline document in the algorithm entitled "Outline of CCCQI CMR Guideline Development."

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Comparison with Guidelines from Other Groups
External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The guideline was evaluated, repeatedly, by the developing team, using the Appraisal of Guidelines Research & Evaluation (AGREE) instrument (www.agreecollaboration.org).

Each review undergoes peer review before submission to the Steering Committee for review. The Steering Committee develops a consensus statement that considers the clinical evidence, applicability and cost effectiveness.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note from Qatif Primary Health Care: English is the main language of the guideline. However, many pages have been written in Arabic to facilitate their implementation by the users, especially nurses. These include recommendations related to lifestyle management and information management.

Cardiometabolic risk factors (CMR) encompasses a cluster of modifiable classic and emerging risk factors and markers that identify individuals at increased risk for cardiovascular disease (CVD) and type 2 diabetes mellitus (T2DM). CMR includes factors that make up the definition of metabolic syndrome (MetSyn); in addition to four other factors: smoking, elevated low-density lipoprotein-cholesterol (LDL-C) inflammatory markers, and insulin resistance.

Cardiometabolic Risk

Metabolic Syndrome

- Abdominal obesity
- Elevated blood pressure (BP) (≥130/85)
- Elevated Fasting Blood Sugar (FBS) (≥110)
- Elevated serum triglycerides (S. Tg) (>150)
- Low HDL (<40)

Elevated low-density lipoprotein (LDL) (≥130)

Smoking Inflammatory markers Insulin resistance

Clinical Highlights and Recommendations

1. Focus on cardiovascular risk reduction (blood pressure control, statin use, aspirin (ASA), and tobacco cessation).
2. Self-management support is necessary for people with CMR to manage their disease.
3. Prevent microvascular complications through annual eye exams, foot risk assessments and foot care counseling, and annual screening for renal function.
4. Screen for renal function by more sensitive tools including albumin-creatinine ratio (ACR) and estimated glomerular filtration rate (eGFR).
5. Screen every individual >45 years of age and obese individuals for CMR factors.
6. Involve other community nurses (those involved in vital signs measurement and laboratory results) in chronic care.
7. Use clinical information to identify individuals at higher need of care.
8. Use quality indicators and electronic data management for monitoring the performance.
9. Build a nurse-led chronic care.
10. Offer multiple tools for assessing lifestyle and self-management.
11. Screen for depression.

Screening

Obesity: Screening and Classification

1. Measure weight in each clinic visit
2. Calculate body mass index (BMI) at least once each year
3. Waist circumference should be measured, at least in overweight persons to better classify them (see table below). (To measure waist circumference locate the top of the hip bone. Place the tape measure evenly around the bare abdomen at the level of this bone. Read the tape measure and record the waist circumference in inches or centimeters.)

Table: Classification of Overweight and Obesity by BMI, Waist Circumference and Associated Risk

Obesity Class	**BMI (kg/m^2)**	**Disease Risk*** (Relative to Normal Weight and Waist Circumference)	**Action**

		Men ≤40 in (≤102 cm) Women ≤35 in (≤88 cm)	>40 in (>102 cm) >35 in (>88 cm)	
Underweight	< 18.5	-	-	Advise for good lifestyle
Normal**	18.5–24.9	-	-	Advise for good lifestyle
Overweight	25.0–29.9	Increased	High	Advise for lifestyle change
Obesity I	30.0–34.9	High	Very high	Evaluate within 2 months
Obesity II	35.0–39.9	Very high	Very high	Evaluate within 2 months
Obesity III	≥40	Extremely high	Extremely high	Evaluate within 2 months

* Disease risk for type 2 diabetes, hypertension, and cardiovascular disease (CVD).

** Increased waist circumference can also be a marker for increased risk even in persons of normal weight.

Hypertension: Screening, Classification and Diagnosis

1. Blood pressure (BP) should be measured in each visit to the clinic.
2. If an elevated blood pressure reading has been obtained, the blood pressure level should be rechecked (see table below).
3. Confirmation of hypertension (persistent high BP) is based on the initial visit plus two follow-up visits with at least 2 blood pressure readings at each visit, over a period of 1 to several weeks.

Table: Definitions, Classification and Actions of Blood Pressure Levels

Category[A]	Systolic (mmHg)	Diastolic (mmHg)	Action
Optimal	<120	<80	Advise for good lifestyle
Normal	120–129	80–84	Advise for good lifestyle
High normal	130–139	85–89	Advise for lifestyle change

Category[A]	Systolic (mmHg)	Diastolic (mmHg)	Action
Grade 1 hypertension (mild)	140–159	90–99	Evaluate and confirm within 2 months
Grade 2 hypertension (moderate)	160–179	100–109	Evaluate and confirm within 1 month
Grade 3 hypertension (severe)	≥180	≥110	Evaluate and treat immediately
Isolated systolic hypertension	≥140	<90	[B]
Hypertensive Urgency: *Grade 3 hypertension (HTN) without signs of Acute target organ damage (TOD)*	≥180	≥110	Evaluate and treat immediately
Hypertensive Urgency: *Grade 3 HTN without signs of Acute TOD*	≥220	≥120	Evaluate, treat and consider admission
Hypertensive Emergency: *Grade 3 HTN with suspicious signs of Acute TOD*	≥180	≥110	Evaluate, call ambulance, stabilize, treat immediately and refer immediately

[A]When a patient's systolic and diastolic blood pressures fall into different categories, the higher category should apply.

[B]Isolated systolic hypertension can also be graded (grades 1, 2, 3) according to systolic blood pressure values in the ranges indicated, provided diastolic values are <90 mmHg.

Criteria for Testing for Diabetes in Asymptomatic Adult Individuals

1. Testing for diabetes should be considered in all individuals at age 45 years and above, particularly in those with a BMI ≥25 kg/m^2, and, if normal, should be repeated at 3-year intervals.
2. Testing should be considered at a younger age or be carried out more frequently in individuals who are overweight (BMI ≥25 kg/m^2) and have additional risk factors:
    - Are habitually physically inactive
    - Have a first-degree relative with diabetes
    - Have delivered a baby weighing ≥4 kg or have been diagnosed with gestational diabetes mellitus (GDM)
    - Are hypertensive (≥140/90 mmHg)
    - Have a high-density lipoprotein (HDL) cholesterol level <35 mg/dL or a triglyceride level >250 mg/dL
    - On previous testing, had impaired glucose tolerance (IGT) or impaired fasting glucose (IFG)

- Have other clinical conditions associated with insulin resistance (e.g., polycystic ovary syndrome [PCOS] or acanthosis nigricans)
- Have a history of vascular disease (e.g., stroke, coronary heart disease [CHD], peripheral vascular disease [PVD])

Table: Definitions, Classification and Actions of Blood Sugar Levels (mg/dL)

Category	Fasting Blood Sugar (FBS)	Oral Glucose Tolerance Test (OGTT)	Random Blood Sugar (RBS)	Action
Normal	<100 mg/dL	<140 mg/dL	[A]	Advise for good lifestyle
Pre-diabetes	100–125 mg/dL (IFG)	140–199 mg/dL (IGT)	[A]	Advise for lifestyle change
Diabetes Mellitus				
• Asymptomatic[B]	≥126 mg/dL[B]	≥200 mg/dL[B]	≥200 mg/dL[B]	Evaluate and confirm within 1 week
• Symptomatic[C]	≥126 mg/dL	≥200 mg/dL	≥200 mg/dL	Evaluate immediately
How Performed	Blood sugar is measured after at least an 8 hour fast (no caloric intake)	75-gram glucose load (drink) is ingested after at least an 8 hour fast; blood sugar is measured at 2 hours	Blood glucose is measured at any time regardless of eating	

[A]Not appropriate for ruling out diabetes mellitus (DM).

[B]Test must be confirmed by repeating on a different day.

[C]The classic symptoms of diabetes include polyuria, polydipsia, and unexplained weight loss.

Hypercholesterolemia: Screening, Classification and Diagnosis

1. Complete lipoprotein profile (total cholesterol, serum triglycerides, low-density lipoprotein [LDL] and HDL) must be obtained after 9- to 12-hour fast.

2. Keeping tourniquet in place longer than 3 minutes may cause 5% variation in lipid values.
3. If lipid measurement is high, one more measurement should be taken prior to classifying risk, initiating drug treatment or starting an intensive lifestyle treatment.
4. If the total cholesterol level varies more than 30-40 mg/dL in the two measurements, a third measurement should be taken and the average of the three measurements should be used as the baseline measure.
5. Diagnosis and reason for re-test have to be noted on the lab request.

Table: Definitions, Classification and Actions of Blood Cholesterol Levels (mg/dL)

Category	Level	Action
LDL Cholesterol (Primary Target of Therapy)		
• Optimal	<100	Advise for good lifestyle
• Near optimal/above optimal	100-129	Advise for good lifestyle
• Borderline high	130-159	Advise for lifestyle change
• High	160-189	Evaluate and confirm within 2 months
• Very high	≥190	Evaluate and confirm within 2 months
Total Cholesterol		
• Desirable	<200	Advise for good lifestyle
• Borderline high	200-239	Advise for lifestyle change
• High	≥240	Evaluate and confirm within 2 months
HDL Cholesterol		
• Low	<40	Evaluate and confirm within 2 months
• High	≥60	Advise for good lifestyle

Cardio-Metabolic Risk (CMR) Screening

Assess CMR for

1. Individuals at age of 45 years and over (preferably, at age of 35 for male)
2. All obese individuals
3. All hypertensive, diabetic and dyslipidemic individuals

Repeat CMR Assessment

- Each 10 years for low risk individuals
- Each 5 years for intermediate risk individuals
- Annually for high risk individuals, hypertensive, diabetic and dyslipidemic individuals

Use CMR1 (CMR Encounter Form no. 1, available in the original guideline document) *to help you in the assessment*.

Aim

To identify individuals at high risk to develop CVD. These include individuals with diabetes mellitus (DM), hypertension, hypercholesterolemia, morbid obesity and multiple risk factors for CVD.

Rationale

Early detection and intervention help to reduce morbidity, improve quality of life and lower cardiovascular (CV) mortality.

How

1. History of
    a. Sedentary lifestyle (assess level of exercise)
    b. DM, hypertension (HTN), dyslipidemia and vascular disease
    c. Smoking
2. Family history of premature cardiovascular disease
3. Measure

    a. BMI ± waist circumference
    b. BP
    c. Fasting blood sugar (FBS) and lipid profile
4. Stratify cardiovascular risk
    - Management of hypertension, hypercholesterolemia and obesity are related to the quantification of total CV risk (i.e., the chance to develop a major CV event in 10 years.) (See the original guideline document for stratification and definitions of CV risk.)

Assessment

Assessment of Hypertension

1. This assessment has to be done in the initial and the annual assessment visits. It might be repeated as needed.
2. Use CMR-2 (CMR Encounter Form no. 2, available in the original guideline document) to help you in the assessment.

Assessment Helps in Finding Answers for

1. What is the level of the BP?
2. Is it a secondary HTN?
3. What other CV risk factors does the patient have?
4. Is there any complication (target organ damage [TOD])?
5. What is the current management, if any?
6. How is the quality of life?
7. What is the risk to develop CVD?

Medical History

- Duration and previous level of high BP
- Previous admissions and visits to the emergency room (ER)
- History of target organ damage/associated clinical conditions (TOD/ACC)
- Symptoms of TOD:
    - **Brain and eyes**: headache, vertigo, impaired vision, transient ischaemic attacks, sensory or motor deficit
    - **Heart**: palpitation, chest pain, shortness of breath, swollen ankles
    - **Kidney**: thirst, polyuria, nocturia, hematuria
    - **Peripheral arteries**: cold extremities, intermittent claudication
- Risk factors for CVD
- Lifestyle (including amount of physical exercise, dietary habits and psychosocial factors that might influence the management of hypertension).
- Previous antihypertensive therapy: drugs used; efficacy and adverse effects; herbs and other traditional therapy.
- Use of other medications that might raise the BP[A]
- Features of secondary hypertension[A]
- History of snoring and sleep apnea. Family history of HTN, premature CVD, premature sudden death, and chronic kidney or endocrine diseases

Physical Examination

- Correct measurement of BP
- 2 or more BP measurements separated by 2 minutes with the patient seated and after standing for at least 2 minutes.
- Verification in the contralateral arm (if values are different, the higher value should be used).
- Measure BMI and waist circumference
- Look for signs of organ damage
    - Brain: murmurs over neck arteries, motor or sensory defects
    - Retina: refer to ophthalmology for fundoscopic abnormalities
    - Heart: location and characteristics of apical impulse, abnormal cardiac rhythms, ventricular gallop, pulmonary rales or bronchospasm, dependent edema

    - Peripheral arteries: diminished or absent peripheral arterial pulsations, carotid bruits, radio-femoral pulse delay and edema; cold extremities and ischaemic skin lesions
- Look for features of secondary hypertension[A]

Laboratory Work Up

- Fasting blood sugar
- Lipid profile (total cholesterol, LDL, HDL and serum triglycerides)
- Serum uric acid
- Serum creatinine and eGFR
- Serum potassium and sodium
- Hemoglobin and hematocrit
- Urinalysis
- Electrocardiogram
- C-reactive protein
- Microalbuminuria

[A] See the table "Secondary Hypertension: Causes and Clinical Features" in the original guideline document.

Assessment of Diabetes Mellitus (DM)

- This assessment has to be done in the initial and the annual assessment visits. It might be repeated as needed.
- Use CMR-2 (CMR Encounter Form no. 2, available in the original guideline document) to help you in the assessment.

Assessment Helps in Finding Answers for

1. What is the type of DM?
2. Is it secondary?
3. What are the other CVD risk factors the patient has?
4. What are the complications he has?
5. What is the current management, if any?
6. Is his DM controlled?
7. How is his quality of life?
8. What is the risk to develop CVD?

Medical History

1. Symptoms and results of laboratory tests
2. Current treatment of diabetes, including medications, meal plan, and results of glucose monitoring
3. Frequency, severity, and cause of acute complications such as ketoacidosis and hypoglycemia (including ER visits and admissions)
4. Prior or current infections, particularly skin, foot, dental, and genitourinary infections
5. Specific system history
6. Symptoms and treatment of chronic eye, kidney or nerve disease
7. Genitourinary (including sexual), bladder, and gastrointestinal function (including symptoms of celiac disease in type 1 diabetic patients)

8. Heart, peripheral vascular, foot, and cerebrovascular complications associated with diabetes
9. Use of medications and herbs that may affect blood glucose levels
10. Risk factors for CVD, including smoking, hypertension, obesity, dyslipidemia, and family history
11. History and treatment of other conditions, including endocrine and eating disorders
12. Assessment for mood disorder
13. Family history of diabetes and other endocrine disorders
14. Cultural, psychosocial, educational, and economic factors that might influence the management of diabetes
15. Nutritional habits, weight history and physical activity
16. Tobacco, alcohol, and/or controlled substance use
17. Contraception and reproductive and sexual history

Physical Examination

1. BMI
2. Blood pressure determination, including orthostatic measurements (sitting and standing)
3. Fundoscopic examination, by an ophthalmologist
4. Oral examination (for signs of redness, bleeding, halitosis, accumulation of debris around the teeth, gingival recession with exposed root surfaces, separation of teeth, and tooth mobility)
5. Thyroid palpation
6. Cardiac examination
7. Abdominal examination (e.g., for organomegaly)
8. Evaluation of pulses by palpation of dorsalis pedis and posterior tibial; and auscultation of carotids
9. Hand/finger examination
10. Foot examination
11. Skin examination (for acanthosis nigricans, insulin-injection sites, infections, and dyslipidemia)
12. Neurological examination
13. Signs of diseases that can cause secondary diabetes (e.g., hemochromatosis, pancreatic disease)

Laboratory Evaluation

1. Average FBS (≥3 readings in the last one week)
2. Glycated hemoglobin (A_{1C})
3. Fasting lipid profile (total cholesterol, HDL, triglycerides, and LDL, liver function tests [LFT] with further evaluation for fatty liver or hepatitis if abnormal)
4. Serum creatinine and calculated GFR (eGFR) or creatinine clearance; ± albumin-creatinine ratio (ACR)
5. Thyroid-stimulating hormone (TSH), if clinically indicated
6. Electrocardiogram in adults
7. Urinalysis for ketone, protein, and sediment

Etiologic Classification of Diabetes Mellitus

I. Type 1 diabetes (beta-cell destruction, usually leading to absolute insulin deficiency)
II. Type 2 diabetes (with variable degree of insulin resistance and secretory defect)
III. Other specific types:
    A. Genetic defects of beta-cell function
    B. Genetic defects in insulin action
    C. Diseases of the exocrine pancreas
    D. Endocrinopathies
    E. Drug- or chemical-induced
    F. Infections
    G. Uncommon forms of immune-mediated diabetes
    H. Other genetic syndromes sometimes associated with diabetes
    I. Gestational diabetes mellitus (GDM)

Complications of DM

A. CVD
B. Nephropathy
C. Retinopathy
D. Neuropathy
E. Diabetic foot complications

Assessment of Hypercholesterolemia

- This assessment has to be done in the initial and the annual assessment visits. It might be repeated as needed.
- Use CMR-2 (CMR Encounter Form no. 2, available in the original guideline document) to help you in the assessment.

Measurement

- Two fasting lipoprotein measurements should be taken to classify the patient's CV risk, prior to initiating drug treatment or intensive lifestyle treatment (see table below). This ensures that true values are within 10% of the mean of the measurements. If the total cholesterol level varies more than 30-40 mg/dL (>16%) in the two samples a third sample should be taken and the average of the three samples should be used as the baseline measure.
- Abnormal lipid test results should always be confirmed with a new specimen, within 1–8 weeks later, before beginning or changing therapy.
- The sample should not be performed during stress or acute illness (e.g., recent myocardial infarction [MI], stroke, pregnancy, trauma, weight loss, use of certain drugs; should not be performed on hospitalized patients until 2-3 months after illness).

Secondary Dyslipidemia

It must be ruled out through medical, dietary, family history and physical evaluation to determine additional risk factors and any genetic factors (see the table "Selected Causes of Secondary Dyslipidemia" in the original guideline document). Laboratory testing including FBS, LFT, renal function tests (RFT), TSH

(other endocrine function tests if indicated), erythrocyte volume and urinalysis must be done in addition to clinical evaluation.

Genetic Disorders

Consider the possibility of a genetic disorder if total cholesterol (TC) is 300 mg/dL or higher or if there is a family history of premature CHD.

Table. LDL Cholesterol Goals and Cut Points for Therapeutic Lifestyle Changes (TLC) and Drug Therapy in Different Risk Categories

Risk Category	LDL Goal	LDL Level at Which to Initiate Therapeutic Lifestyle Changes	LDL Level at Which to Consider Drug Therapy
CHD or CHD Risk Equivalents (High CV Risk)	<100 mg/dL	>100 mg/dL	≥100-130 mg/dL
2+ Risk Factors (Moderate CV Risk)	<130 mg/dL	>130 mg/dL	≥130-160 mg/dL
0-1 Risk Factor (Low added Risk)	<160 mg/dL	>160 mg/dL	≥160-190 mg/dL

Screening for Depression

Why Screen for Depression?

1. Depression is the most frequently cited psychological disorder associated with diabetes. It is roughly three times more prevalent in those with diabetes (15-20% of people) than in those without diabetes.
2. Screening improves the accurate identification of depressed patients in primary health care (PHC).
3. Providers may mislabel lack of attention to self-care as non-compliant behavior when, in fact, it may indicate the need to screen for depression.
4. Early recognition of depression symptoms, prompt treatment, and referral lead to improved self-care and quality of life and decreases clinical morbidity.

Symptoms of Depression

The following changes characterize symptoms of depression:

- Decreased ability to cope with changes or challenges in life
- Changes in crying patterns
- Changes in sleeping and eating patterns
- Changes in ability to concentrate
- Changes in sexual desire
- Increased pessimism
- Sense of helplessness

- Thoughts of death or suicide
- Severe sadness
- Loss of interest in usual activities

How to Screen for Depression?

1. Asking two simple questions about mood and anhedonia may be as effective as using any of the longer screening instruments:
    a. "Over the past two weeks have you felt down, depressed, or hopeless?"
    b. "Over the past two weeks, have you felt little interest or pleasure in doing things?"
2. Use formal screening tools, such as the depression scale of the Patient Health Questionnaire, PHQ-9

See the original guideline document for details on the PHQ-9 test and how to interpret results.

Identify and monitor severity of depression every 2-4 weeks. Consult a specialist if there is no improvement.

Assessing Renal Function in CMR

Please see the clinical algorithm "Assessing Renal Function in CMR" in the original guideline document.

Foot Care in DM

Please see the clinical algorithm "Foot Care in DM" in the original guideline document.

Control

Blood Pressure

Please see the clinical algorithms "Initial Approach to High Blood Pressure in PHC" and "BP Control: Chronic Management" in the original guideline document.

Blood Pressure Control: Choice of a Plan

Choice of a plan for blood pressure control depends on the level of the cardiovascular risk (see the original guideline document for a table on stratifying risk and the tables below)

Table. Match CVR with Its Corresponding Plan

Other Risk	Blood Pressure (mmHg)

Factors and Disease History	**Normal**: Systolic blood pressure (SBP) 120-129 or Diastolic blood pressure (DBP) 80-84	**High Normal**: SBP 130-139 or DBP 85-89	**Grade 1**: SBP 140-159 or DBP 90-99	**Grade 2**: SBP 160-179 or DBP 100-109	**Grade 3**: SBP >180 or DBP >110
No other risk factors (RF)	No blood pressure (BP) intervention	No BP intervention	Lifestyle changes for several months, then drug treatment if BP uncontrolled	Lifestyle changes for several weeks, then drug treatment if BP uncontrolled	Immediate drug treatment and lifestyle changes
1-2 risk factors	Lifestyle changes	Lifestyle changes	Lifestyle changes for several weeks, then drug treatment if BP uncontrolled	Lifestyle changes for several weeks, then drug treatment if BP uncontrolled	Immediate drug treatment and lifestyle changes
3 or more risk factors, Metabolic syndrome (MetSyn), Target organ damage (TOD) or diabetes	Lifestyle changes	Drug treatment and lifestyle changes	Drug treatment and lifestyle changes	Drug treatment and lifestyle changes	Immediate drug treatment and lifestyle changes
Established CV or renal disease (CVRD)	Drug treatment and lifestyle changes	Immediate drug treatment and lifestyle changes	Immediate drug treatment and lifestyle changes	Immediate drug treatment and lifestyle changes	Immediate drug treatment and lifestyle changes

Table. Which Anti-hypertensive Agent to Use?

Risk Factor/Disease	1st Choice	Second-line Choice	Cautions/Notes
Hypertension without compelling indications for specific agents	Thiazide diuretics, beta-blockers, Angiotensin-converting enzyme inhibitor (ACEI), angiotensin receptor blocker (ARBs), or long-acting calcium channel blocker (CCBs) (consider ASA and statins in selected patients)	Combination of 1st choice drugs	Alpha-blockers are not recommended as initial therapy. Beta-blockers are not recommended as initial therapy in those >60 years of age. Hypokalemia is avoided by using potassium (K^+)-sparing agents in those prescribed diuretic monotherapy. ACEI are not recommended as initial monotherapy in Blacks.
Isolated systolic hypertension without compelling indications for specific agents	Thiazide diuretics, ARBs or long-acting DHP-CCBs	Combination of 1st choice drugs	Hypokalemia should be avoided by using K^+-sparing agents in those prescribed diuretics
Diabetes mellitus with nephropathy	ACEI or ARBs	Addition of thiazide diuretics, cardio-selective beta-blockers, or long-acting CCBs	If serum creatinine level is >2 mg/dL, a loop diuretic should be used as a replacement for low-dose thiazide diuretics if volume control is required.
Diabetes mellitus without nephropathy	ACEI, ARBs or thiazide diuretics	Combination of 1st choice drugs or addition of cardio-selective beta-blockers with or without long-acting CCBs	
Metabolic syndrome	ACEI or CCB	ARB	
Angina	Beta-blockers and ACEI	Long-acting CCBs	Avoid short-acting nifedipine
Established atherosclerotic	ACEI added to other therapy		

Risk Factor/Disease	1st Choice	Second-line Choice	Cautions/Notes
disease			
Previous myocardial infarction	Beta-blockers and ACEI	Combination of additional agents	
Heart failure	ACEI, beta-blockers and spironolactone	ARBs; thiazide or loop diuretics, as additive therapy	Avoid non-dihydropyridine (DHP) CCBs (diltiazem, verapamil)
Previous cerebrovascular accident (CVA) or transient ischaemic attack (TIA)	ACEI/diuretic combination		Blood pressure reduction reduces recurrent cerebrovascular events
Chronic kidney disease; microalbuminuria	ACEI (diuretics as additive therapy)		Avoid ACEIs in bilateral renal artery stenosis
Left ventricular hypertrophy (LVH)	ACEI, ARBs, long acting CCBs, thiazide diuretics (beta-blockers for those under 60 years)		Avoid hydralazine and minoxidil
Peripheral arterial disease	ACEI added to other therapy	CCB	Avoid beta-blockers with severe disease
Dyslipidemia	No special recommendation		
Elderly (isolated systolic hypertension (HTN)	Diuretic; CCB		No definite evidence of an increase in risk of aggressive treatment (a J-curve) unless diastolic blood pressure (DBP) is lowered to <55 or 60 mmHg by treatment
Lactating	Propranolol and labetalol are preferred if a beta-blocker is indicated		Diuretics may reduce milk volume.
Pregnancy	Methyldopa,		ACEIs and ARBs

Risk Factor/Disease	1st Choice	Second-line Choice	Cautions/Notes
	labetalol, CCB		should be avoided (associated with adverse fetal and neonatal renal effects.)
Bronchospasm; 2nd/3rd degree heart block			Beta-blockers should generally be avoided
Smokers			Interferes with the beneficial effects of beta-blockers
Hyperthyroidism; anxiety; sinus tachycardia	Beta-blockers		
Atrial fibrillation	Recurrent atrial fibrillation (AF): ACEI, ARB	Permanent AF: beta-blocker, non-dihydropyridine (NDHP)-CCB	

Resistant Hypertension

Hypertension may be termed resistant to treatment, or refractory, when a therapeutic plan that has included attention to lifestyle measures and the prescription of at least three drugs in adequate doses has failed to lower systolic and diastolic blood pressure sufficiently. In these situations, referral to a specialist should be considered, as resistant hypertension is known to be often associated with target organ damage.

Change of Anti-HTN Medications: General Principles

Changing therapy risks new side effects and it may take time to re-establish adequate control of blood pressure. A change of therapy is unlikely to be appropriate in patients on three or more antihypertensive drugs.

Once a hypertensive drug therapy is initiated, most patients should return for follow-up and medication adjustments at least at monthly intervals until BP goal is reached.

If blood pressure goals are not met the clinician has three options for subsequent therapy:

1. Increase the dose of the initial drug toward maximal levels
2. Substitute an agent from another class

3. Add a second drug from another class

Individualized Drug Selection Is Based on Several Principles

1. If the initial response to one drug is:
    - Adequate: continue the same drug
    - Partial: increase the dose or add a second drug of a different class
    - Little: substitute another single drug from a different class
2. Consider low-dose diuretic use early or as a first addition
    - Consider loop diuretic agents instead of thiazide or thiazide-like diuretics when creatinine is >2.0 mg/dL or eGFR <30
3. Do not combine two drugs of the same class
4. Combine agents at medium doses. It can be more effective than a high-dose single agent. In addition, it can result in fewer side effects
5. Combination is more effective if a medicine from column 1 is combined with another from column 2

Column 1	**Column 2**
• Diuretics • Calcium channel (CC) blockers	• Angiotensin-converting enzyme (ACE) inhibitors • Angiotensin receptor (AR) blockers • Beta-blockers

Hyperglycemia

Please see the clinical algorithms "Initial Management of Symptomatic Hyperglycemia" and "Glycemic Control: Chronic Management" in the original guideline document.

Use of Oral Hypoglycemic (OHG) Agents

- Once an OHG drug therapy is initiated, most patients should return for follow-up and medication every 1-2 weeks until glycemic goal is reached.
- If glycemic goals are not met the clinician has three options for subsequent therapy:
    1. Increase the dose of the initial drug toward maximal levels
    2. Substitute an agent from another class
    3. Add a second drug from another class
- Start metformin use early or as a first addition, unless contraindicated. Begin with low dose and titrate gradually, to avoid gastrointestinal intolerance
- Do not combine two drugs of the same class
- Combine agents at medium doses. It can be more effective than a high-dose single agent. In addition, it can result in fewer side effects

Notes on Use of Insulin in Type 2 Diabetes Mellitus (T2DM)

- Early initiation of insulin would be a safer approach for individuals presenting with weight loss, severe symptoms and random blood sugar (RBS) >250-300 mg/dL.
- Insulin might be added to the oral regimen if glycemic control is not achieved, after the use of two different classes. This has to be done by an expert physician.

Target Glycemic Control

- A_{1C} <7%
- If A_{1C} is not available
    - Average fasting blood sugar (FBS) 90–130
    - Average post-prandial blood sugar (PPBS) <180

Assessment of Glycemic Control

Glycemic control is best assessed by A_{1C}. Please note that:

1. Hemoglobinopathies, hemolysis and blood loss interfere with its accuracy.
2. Fructosamine (reflects glycemic control in the last 1-2 weeks) might be used instead, if available.
3. Average of multiple readings of FBS is a useful tool in achieving glycemic control (done daily or alternately). However, it reflects control over the measurement period only.

Hyperlipidemia

Please see the clinical algorithm "LDL Control: Initiation of Drug Treatment" in the original guideline document.

Notes on the Use of Statins

1. Bedtime or evening dose of statin is more effective (higher cholesterol synthesis).
2. Dosage adjustments should not be made more often than every 4 weeks after a fasting lipid profile.
3. If patients are intolerant to a statin, clinicians are encouraged to have the patient try the other statins in reduced doses before ruling out all statins.
4. If patients are unable to take a statin, then fibric acids and other lipid lowering agents may be used.

Safety Considerations

5. **DO**
    - Check baseline renal function and TSH prior to initiating statin therapy.
    - Check alanine aminotransferase (ALT) and aspartate aminotransferase (AST) levels prior to prescribing a statin and prior to any planned increase in statin dose.
    - Consider the potential for drug-drug interactions when prescribing statins. Vitamin E intake may reduce the benefit of statins.

- Counsel patients to discontinue statin therapy during a short course of a macrolide antibiotic (erythromycin, azithromycin, and clarithromycin).
- Be alert for patient characteristics that may increase the risk for myopathy during statin therapy, such as advanced age, renal or liver impairment, diabetes with evidence of hepatic fatty changes, hypothyroidism, surgery, trauma, ischemia-reperfusion, debilitated status, heavy exercise.
- Provide patient education regarding recognition and reporting of symptoms of myopathy during statin therapy.
- Suspect myopathy when a statin-treated patient complains of unexplained, generalized muscle pain, tenderness, or weakness. Joint pain, nocturnal leg cramps, or localized pain are not symptoms of myopathy.
- Assess for signs of dehydration or renal compromise in patients with myopathy.
- Check creatine kinase (CK) levels when a patient reports symptoms of myopathy.
    - If CK levels are less than 5 times upper limit of normal, repeat measurement in 1 week.
    - If CK levels are elevated to 5 times upper limit of normal or greater, discontinue statin therapy and monitor serum CK levels.
- Consider referral for patients requiring combination lipid-lowering therapy.

6. **DON'T**
    - Prescribe high-dose statin therapy for elderly patients and patients with renal insufficiency, or in combination with fibrates.

Note on Starting Long-Term Aspirin Therapy

- Aspirin (ASA) reduces the risk of a cardiovascular event by about 25% over 5 years, in both sexes.
- The decision to use aspirin should be based on a balance of the risks and benefits for each person, taking into account their absolute risk of an event.

ASA Indications

- Very High CV Risk:
    - Commence low-dose ASA (75-150 mg)
- High CV Risk:
    - Commence low-dose ASA (75-150 mg) unless contraindicated. Low-dose ASA is as effective as higher daily doses and may be associated with less side effects.
- Low-Medium CV Risk:
    - The risk of significant adverse effect (bleeding) outweighs the benefits of ASA for the prevention of CVD.

ASA Contraindications

- ASA allergy

- ASA intolerance
- Uncontrolled blood pressure
- Active peptic ulceration
- Any major bleeding risk

CLINICAL ALGORITHM(S)

The original guideline document contains clinical algorithms for:

- Cardiometabolic Risk (CMR) Screening
- Chronic Management of CMR
- Assessing Renal Function in CMR
- Foot Care in Diabetes Mellitus (DM)
- Initial Approach to High Blood Pressure (BP) in Primary Health Care (PHC)
- BP Control: Chronic Management
- Initial Management of Symptomatic Hyperglycemia
- Glycemic Control: Chronic Management
- Low-Density Lipoprotein (LDL) Control: Initiation of Drug Treatment
- Lifestyle Management (in Arabic only)
- CMR Patient Recall

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is not specifically stated for each recommendation. In general, published evidence-based guidelines were used as the basis for the recommendations.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Early identification of cardiometabolic risk factors
- Effective intervention to prevent the development of hyperglycemia (diabetes mellitus type 2), hypertension, and hyperlipidemia
- Early and effective treatment of for hyperglycemia (diabetes mellitus type 2), hypertension, and hyperlipidemia

POTENTIAL HARMS

Aspirin: Bleeding is the most serious side effect.

See the tables "Which Anti-Hypertensive Agent to Use?," "Anti-Hypertensive Agents," "Anti-Glycemic Agents," and "Dyslipidemic Agents" in the "Major Recommendations" field and in the original guideline document for potential side effects of these agents.

CONTRAINDICATIONS

CONTRAINDICATIONS

- Aspirin Contraindications
  - Aspirin allergy
  - Aspirin intolerance
  - Uncontrolled blood pressure
  - Active peptic ulceration
  - Any major bleeding risk
- See the tables "Which Anti-Hypertensive Agent to Use?," "Anti-Hypertensive Agents," "Anti-Glycemic Agents," and "Dyslipidemic Agents" in the "Major Recommendations" field and in the original guideline document for contraindications to using these agents in patients with various co-existing medical conditions.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- This Cardiometabolic Risk (CMR) Guideline is designed to assist clinicians by providing a framework for the evaluation and treatment of CMR patients, and is not intended to replace a clinician's judgment.
- The recommendations of the guideline are concordant with those made by most international guidelines, with some minor adaptations to the national health care system.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Priority Aims

A multifactorial intervention targeting hyperglycemia and cardiovascular risk factors is the most effective approach to control the disease and prevent complications. Both individual measures of care as well as comprehensive measures of performance on multifactorial interventions are recommended.

1. Decrease the percentage of patients with poorly controlled blood sugars, blood pressure (BP) and low-density lipoprotein (LDL).
2. Decrease the percentage of cardiovascular risk.
3. Increase the percentage of patients for whom recommended workup (including hemoglobin A_{1c} and LDL) are done.
4. Increase the percentage of patients for whom recommended treatment goals are met.
5. Improve self-management skills.
6. Increase the percentage of patients for whom cardiovascular risk (CVR) is estimated.
7. Increase the percentage of general patients for whom BP is measured in every visit.

8. Increase the percentage of general patients for whom body mass index (BMI) is calculated once a year at minimum.
9. Increase the percentage of general patients of age 45 years and older or with BMI >30 screened for cardiometabolic risk (CMR).
10. Increase the percentage of hypertensive diabetes mellitus (HTN-DM) patients for whom an angiotensin-converting enzyme inhibitor (ACEI) was prescribed.
11. Increase the percentage of high CVR patients for whom aspirin was prescribed.
12. Increase the percentage of high CVR patients for whom statin was prescribed.

Expected Barriers in Implementation

Few barriers may hamper the dissemination and implementation of this guideline. These include the difficulty in affording stable trained staff assigned for chronic care; laboratory tests such as albumin-creatinine ratio (ACR), A_{1c} and lipid profile; medications such as statin, apparatus such as proper cuffs, tuning forks and sensory monofilaments; and stationeries such as guideline printings, educational material and encounter forms.

Quality Measures

The purpose of the guideline is to control CMR. However, producing the guideline alone is insufficient to address this goal. There must be a continuous process of implementation involving education and audit. For this purpose, many quality measures are used nationally and worldwide. For this purpose a dedicated team has been assigned for this task. Many efforts have been paid to review and appraise the commonly used measures. Please refer to the original guideline document for more information on quality measures.

IMPLEMENTATION TOOLS

Audit Criteria/Indicators
Chart Documentation/Checklists/Forms
Clinical Algorithm
Foreign Language Translations
Patient Resources
Pocket Guide/Reference Cards

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness
Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Quality Improvement Team in Chronic Care (CCQI). Cardiometabolic risk management in primary care. Qatif (Saudi Arabia): Qatif Primary Health Care; 2008. Various p.

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2008

GUIDELINE DEVELOPER(S)

Qatif Primary Health Care - National Government Agency [Non-U.S.]

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Qatif Primary Health Care

GUIDELINE COMMITTEE

Practice Guidelines Writing Committee

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Committee Members: Bader Almustafa, MD; Nada Alfaraj, MBBS; Aamal Almobarak, BSc; Nawal Al-Eid, BSc, RN; Farha Almarhoon, RN, RE

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format from the Abu Dhabi Medical Conference Web site.

Print copies: Available by request. E-mail: cccqi.ksa@gmail.com.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Cardiometabolic risk management. Pocket guideline. Qatif (Saudi Arabia): Qatif Primary Health Care. 2008. 2 p. Electronic and print copies: Available by request. E-mail: cccqi.ksa@gmail.com.

Additionally, a variety of implementation tools are available in the original guideline document, including blood pressure measurement standards, audit criteria, encounter forms, and register diaries.

PATIENT RESOURCES

Several Arabic-language patient educational tools and pamphlets are available in the original guideline document.

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC STATUS

This NGC summary was completed by ECRI Institute on February 12, 2009. The information was verified by the guideline developer on February 14, 2009.

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